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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,767	03/31/2004	Hankyu Moon	NECL-04-001	5251

7590 04/16/2007
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EXAMINER

BITAR, NANCY

ART UNIT	PAPER NUMBER
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2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/813,767

Applicant(s)

MOON ET AL.

Examiner

Nancy Bitar

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-5, drawn to generating a sparse of a human face, classified in class 382, subclass 159.
 - II. Claim 6, drawn to constructing a set of sparse representation filters (SRF) to accumulate edge response, classified in class 382, subclass 118.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as combination and subcombination.

Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the sparse representation of invention I is broader and does not need the filter approach for picking up gradient responses from facial features. The subcombination has separate utility such as constructing a set of sparse

Art Unit: 2624

representation filters (SRF) to accumulate edge response along a boundary of a facial landmark.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

3. During a telephone conversation with Mr. Jeffrey Brosemer on 04/10/2007 a provisional election was made without traverse to prosecute the invention of estimating a pose of a human head in natural scene by generating a sparse representation of human face, claims 1-5. Affirmation of this election must be made by applicant in replying to this Office action. Claim 6 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Examiner Notes

4. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied

Art Unit: 2624

to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Information Disclosure Statement

5. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2624

7. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al (Y.Li, S.Gong, and H. Liddell in an article entitled "Support vector regression and classification based on multi-view face detection and recognition", which was presented at FG2000).

As to claim 1, Li et al teaches a method of estimating a pose of a human head in natural scenes comprising the steps of: generating, a sparse representation of a human face; training, the sparse representation to a set of face(s) in known poses (filter captures the changes both in horizontal and vertical directions which correspond to yaw and tilt changes respectively the filtered pattern are more representative than the original images; section 3.1 and figure 4 is a sample of training faces); and determining, a pose of a head by comparing the trained representation(s) to a facial image (the first 10 PCs and the reconstructed pattern from the first 20 PCs are compared to the original images and the filtered patterns, section 3.1; estimation head pose using SVR).

As to claim 2, Li et al teaches the method according to claim 1 further comprising the steps of: transforming a raw facial image into sets of vectors representing fits of the face to a random, sparse set of model configurations (section 2; support vector machine).

As to claim 3, Li et al teaches the method according to claim 2 wherein the transforming step further comprises the step of: collecting, salient features of the face image which are useful to estimate the pose of the face (nose bone, soft boundaries, face characteristics; section 3.2).

Art Unit: 2624

As to claim 4, Li et al teaches the method according to claim 3 wherein the transforming step further comprises the step of: suppressing, irrelevant variations of face appearance (figure 2 and section 3.2 and 4.3; note that PCA keeps essential features of recognition in order to remove the redundancy with respect to probability and gradient).

As to claim 5, Li et al teaches method according to claim 4 wherein the training step further comprises the step of: learning, using Support Vector Regression (SVR), a relation between the sparse representation and the pose(s) (estimating the pose using SVR pose estimator, section 3 and 3.1).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fujimura et al (2005/0058337) Is cited to teach a system for estimating orientation of a target based on real-time video data uses depth data included in the video to determine the estimated orientation. The system includes a time-of-flight camera capable of depth sensing within a depth window. The camera outputs hybrid image data (color and depth). Segmentation is performed to determine the location of the target within the image. Tracking is used to follow the target location from frame to frame. During a training mode, a target-specific training image set is collected with a corresponding orientation associated with each frame. During an estimation mode, a classifier compares new images with

Art Unit: 2624

the stored training set to determine an estimated orientation. A motion estimation approach uses an accumulated rotation/translation parameter calculation based on optical flow and depth constrains. The parameters are reset to a reference value each time the image corresponds to a dominant orientation.

Miller et al (US 2006/0034495) is cited to teach method for human face detection that detects faces independently of their particular poses and simultaneously estimates those poses

Moustafa (US 6,959,109) is cited to teach a method for determining the pose angle of an object in an input image. In a preferred embodiment, the present system comprises a pose estimator having a prototype projector, a regression estimator, and an angle calculator

Inquiries

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The

Art Unit: 2624

fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar

04/10/2007



JOSEPH MANCUSO
ADVISORY PATENT EXAMINER